Deep Learning and Transfer Learning

Theory and Tools

* Deep Learning
* Low Ranks Matrix Analysis

Background of Machine Learning

* Algorithm can learn the data

1. Linear model
2. Convolutional neural network
3. Nearest neighbor search
4. Regression

ICML 2010

CVPR 2012

Machine Learning

Transfer learning

* Learning something from similarities
* Instance based approach
* Parameter based approach
* Relational knowledge
* Feature based approach
  + Subspace Learning
  + Intermediate subspace
  + Metric learning

Low – Rank Transfer Learning

* Low-rank Sparse Modeling
* Sparse Representation
* Low-rank representation
  + Transfer the source and the target to the common subject to compare
* PCA
* LDA
* Face Recognition

Latent Low-rank Transfer Learning

* Low resolution vs high resolution
* Crossing Modality
* Recover the missing Modality

Autoencoder and Transfer Learning

* Vanishing or exploding gradient – before
* With autoencoder and layer wise pre-training
* Minimize the square loss
* Denoising Autoencoder
* Deep Low-rank Coding